Albino Mertensia.—Several years ago I procured some pips of *Mertensia Virginica* and planted them out. This year a white one bloomed in the bed, and also several pink ones. The pink ones may have flowered before and escaped my notice, but the white could not have done so. Has it been blue until this year and suddenly changed, or has it failed to flower for six or seven years?

E. S. MILLER.

Botanical Notes.

Histological Investigation, as applied to drugs, is evidently becoming an important part of pharmaceutical education in this country, judging from an elaborate paper on *Illicium Floridanum*, published in the *American Journal of Pharmacy* for May. The paper is illustrated with four plates, showing the minute structure of the fruit, seed, leaves, stem, bark and root of the plant. In the same journal a chemical investigation of the root of *Collinsonia Canadensis*, by Mr. C. N. Lochman, is recorded. The author finds that the rhizome contains a resin soluble in ether and partly in alcohol, vegetable wax, tannin, mucilage and starch, while the leaves contain resin, tannin, wax and volatile oil.

The Yaupon (*Ilex Cassine*, L.).—As well known, the leaves of this plant were formerly used by the Southern Indians in making a preparation called "black drink." A large quantity of the leaves was thrown into a great kettle of water suspended over a fire, and the Indians, sitting around, helped themselves to large draughts, which after a short time induced free and easy vomiting. This treatment was continued during two or three days, until it was considered that a sufficient cleansing had been effected. Some of these leaves have been submitted to a chemical examination by Dr. Venable, who reports (*Journ. Amer. Chem. Soc.*, April, p. 100) that he obtained from them a small quantity of caffeine, equalling .27 per cent. of the weight of leaves used. It will be remembered that caeffeine has also been found in "mate" (*Ilex Paraguayensis*), used in South America as a beverage.

The Respiration of Plants.—In a note communicated by Messrs. G. Bonnier and L. Mangin to the Paris Academy of Sciences (*Comptes Rendus*, c. 1303), these authors point out that hitherto the amount of oxygen given out by plants to the air has been supposed to represent the total result of the fixation of carbon. They show that this is not the case, but that at the same time that the carbon is assimilated by the chlorophyll, the protoplasm absorbs oxygen and emits carbonic acid. An analysis of the gas emitted by a plant, therefore, only represents the difference between the amount of oxygen disengaged by assimilation of carbon and the amount absorbed by respiration, and on the other hand, between the carbonic acid decomposed by assimilation and the carbonic acid produced by respiration. Three methods are given for separating the result of the action of chlorophyll from that of respiration. One is by calculating the difference between the whole amount of gas emitted and absorbed by plants exposed to light, and the volume which they emit by respiration

alone in the same light. A second method consists in suppressing assimilation by the use of chloroform or ether without altering the respiration. In the third method, two plants, of which physiological identity has previously been ascertained, are exposed, the one to ordinary air, and the other under similar conditions except that a concentrated solution of barium hydrate is placed in the containing apparatus to absorb the carbonic acid formed. Under these circumstances an excess of oxygen is found in the apparatus without baryta, while in the apparatus containing it the carbonic acid when set free by hydrochloric acid is found to be in excess of that in the other vessel. The conclusion arrived at by the authors from these experiments is that the volume of oxygen disengaged by assimilation is greater than that contained in the carbonic acid decomposed.

Four cases of poisoning through children eating snowberries (*Spmphoricarpus racemosus*) are recorded in the *British Medical Journal* for May 16. The symptoms produced were vomiting, purging and delirium, followed by a semi-comatose condition. All four children recovered, although one suffered very severely.

Fossil Fungus.—A certain proof of the existence of fungi at very remote epochs has been furnished by Messrs. B. Renault and E. E. Bertrand, who have found in the tissues of the nucleus of *Sphærospermum oblongum*, a plant of the coal measures, a fossil species preserved by silica. The mycelium of this fungus was composed of delicate branches, which were elongated or irregularly clustered, according to the dimensions of the cells by which they were enveloped. The cells of the hyphæ were 10μ in length by 5μ in width, and appear to have been capable of becoming sporangia or of remaining sterile. The sporangia were ovoid, and 40 to 45μ in length by 20 to 25 in width, and swollen at the side. The fungus belonged among the Chytridiaceæ.—*Revue Scientifique.*

Influence of Heat and Light upon Vegetation.—*Ciel et Terre* gives the researches of Mr. Hellriegel upon this subject. Mr. Hellriegel undertook in the first place to ascertain the lowest temperature at which seeds are capable of germinating, and confined his experiments to 18 species of cultivated plants. The seeds, sprinkled with distilled water, were planted in large receptacles filled with vegetable mould that were raised to constant temperatures of 48° F., 40°, 38°, 35°, and 32°, and kept there for from 35 to 60 hours.

It was found that rye and winter wheat geminated at 32°. Barley and oats showed their cotyledon at 32°, but the root did not start till 35° were reached. Indian corn required 48°. The turnip germinated at 32°, flax at 35°, the pea and clover at 35°, the bean and lupin at 38°, asparagus at 35°, the carrot at 38°, and the beet at 40°.

The respiratory function requires little heat, and operates even in the entire absence of light. Heat and light, on the contrary, are most favorable for the assimilation of carbonic acid and its conversion into carbon. Mr. Hellriegel attaches very little importance to the color of the light.

Influence of Sunlight upon Vegetation.—M. Buysman contributes to a recent number of *Nature* an article on the influence of direct sunlight upon vegetation. He remarks that in the tropics plants are less de-

pendent upon sunlight than in the arctic regions, owing to the constant high temperature. The author considers that the direct solar heat is the cause of the rich vegetation in some parts of the mountains of the temperate zone. The action of the sun's heat is most evident in the arctic regions, where Middendorff observed in full flower a *Rhododendron*, of which the stem and roots were frozen hard in the soil. He also met with a fully developed willow catkin peeping out of the snow, although the branch on which it grew was solidly frozen two inches down from the flower. It is obvious, therefore, that the temperature in the shade is no criterion of the temperature by which the vegetation of plants is raised.

A new Use for Eucalyptus Trees.—The patenting of a process for the manufacture of a preparation of the gum of *Eucalyptus globulus*, which has the effect of thoroughly removing the scales which form on steam-engine boilers, and of preventing rust and pitting, has created a largely increased demand for it both in this country and in Europe. The effect of this preparation in preventing the pitting and corrosion of boilers will, it is expected, extend the period of their usefulness 100 or 150 per cent., and, at the same time, effect a great saving in fuel, as scale is a non-conductor of heat. The company owning the patent, at Piedmont (Cal.), has also embarked in the distillation of essential oils of the *Eucalyptus globulus* which have heretofore been supplied by Australia, it being found that they can be produced at profit. With this object in view, the company proposes to set out extensive forests of *Eucalyptus*-trees, in order to have at its command a sufficient supply of leaves, the portion of the tree consumed in the manufacture of the oils.

The Egyptian Lotus.—Sir Gardner Wilkinson says of this plant: The *Nymphæa Lotus* grows in ponds and small channels in the Delta during the inundation, which are dry during the rest of the year; but it is not found in the Nile itself. It is nearly the same as our white water-lily. There are two varieties, the white, and that with a bluish tinge, or the *Nymphæa cærulea*. Though the favorite flower of Egypt, there is no evidence of its having been sacred; but the god Nefer-Atum bore it on his head, and the name *Nufar* is probably related to *nofar*, "good," and connected with his title. It was thought to be a flower of Hades or Assiente, and on it also Harpocrates is often seated. He was the Egyptian Aurora, or day-spring; not the god of silence, as the Greeks supposed, but figured with his finger in his mouth, to show one of the habits of childhood of which he was the emblem. Hence he represented the beginning of day, or the rise and infancy of the sun, which was typically portrayed rising every morning from that flower, or from the water; and this may have given rise to the notion of Proclus that the lotus-flower was typical of the sun. The lotus-flower was always presented to guests at an Egyptian party. It is evident that the lotus was not borrowed from India, as it was the favorite plant of Egypt before the Hindoos had established their religion there.

Change in bifoliar Spurs of Pinus.—In a paper lately read at the Royal Botanical Society of Edinburgh, Professor Dickson exhibited specimens of *Pinus sylvestris*, in which some of the ordinary bifoliar

spurs or shortened branches had been stimulated to develop leaves with internodes, as is sometimes seen in the terminal shoots of the larch, thus showing a reversion to the condition which is present in the seedling plants of *P. sylvestris*. He also called attention to the fact that these spurs in *Pinus* fall off bodily after a certain period, from two to five years according to the species, thus approximating, as previously pointed out by Dr. J. Stark (*Trans. Roy. Soc. Edin.*, vol. xxvii., pp. 651–9), to many Cupressineæ, in which the individual leaves do not fall off, but where there is from year to year a shedding of leafy twigs, a phenomenon to which the term cladoptosis has been applied. In the genera *Sciadopitys* and *Phyllocladus* there are no foliage leaves at all in the adult state, these being all reduced to scales, and the function of the leaf performed by cladodes, which are slender and needle-like in *Sciadopitys* and form flat expansions in *Phyllocladus*.

Fir Leaf Wool.—Fir wool is a textile fibre which in Saxony is manufactured out of the needles of the fir-tree, the process being partly chemical and partly mechanical. For this purpose the needles are gathered in spring and summer, when they are young and green, old and withered ones being unsuitable. They are taken into barns, and there dried in a current of air. When dried, they are subjected to a settling and fermenting process similar to that in use for flax. This softens the woody parts and loosens them from the fibre, but the complete separation is only obtained after a lengthy boiling by steam. During this boiling a by-product is obtained in the shape of an oil (fir-wood oil), which is gathered and sold to chemists as a remedy for rheumatism and gout, its properties being similar to those of turpentine. The complete separation of bast and fibre is produced exactly as with flax. The fibre is now passed through a milling machine similar to that in use for woolen cloth, and is then carded and spun like cotton. Generally the carded fibre is mixed with a certain proportion of cotton or wool, and thus a kind of merino yarn is produced, which is worked in the hosiery frames into singlets, drawers, and stockings, these fabrics being then sold as anti-rheumatics and as a preventive of gout. When examined under the microscope the fibre appears as a tube, and striped, and as if covered by a fine network. Goods made of this fibre are sold to a considerable extent in Germany, though they are dearer than the ordinary merino goods.

Thuja gigantea is, among the trees on the north-west coast, the Indian's best friend, for out of its wood and bark he manufactures endless articles of domestic, hunting, fishing, and warlike economy. Most of his canoes are hollowed out of it, at least in Vancouver Island; and there is a case quoted where a canoe made out of *Cupressus Nutkaensis*, in Vancouver, was quite an exception, and indeed the canoe was probably traded from some of the northern tribes, and not of Vancouver manufacture at all. The Indian ropes are also very commonly twisted out of its bark. North of latitude 53° *Cupressus Nutkaensis* takes the place of *Thuja gigantea*, and is applied by the Indians to all the useful purposes of the latter, and to some others in addition. For instance, at the Matlakatlah Mission, on the

coast of British Columbia, in about latitude 54° north, where there are fine groves of it, it is sawn into lumber and sent to Victoria, where it meets a ready sale among the cabinetmakers, as it takes a fine polish and works beautifully. Most of the prettily polished discs and little cylinders used by the Indians in gambling are made either from this wood or from that of *Acer macrophyllum*. It is also valuable for ship- or boat-building. The wood of *T. gigantea* is whitish, but in its fresh state is yellower; hence the name yellow cypress applied to it. It is light, tough, durable and easily worked, and, in addition, has a pleasant fragrance. On this account the Russians about Sitka used to call it *dushnik*, or 'scented wood.' It was at one time exported to China, and returned marked with Chinese characters, which warranted it as "real Chinese camphor-wood," puissant for many purposes, and a sovereign remedy against moths in drawers! In repairing old Fort Simpson, the only log found sound after twenty-one years' trial of those used for under-pinning was a stock of this.—*The Garden.*

Botanical Literature.

Mushrooms of America, Edible and Poisonous. Edited by Julius A. Palmer, Jr. Published by L. Prang & Co., Boston.

This is a collection of twelve colored charts of edible and poisonous toadstools prepared for popular use rather than for students of science. All technical terms are therefore as far as possible avoided. The fungi illustrated are the more common edible species and such dangerous and suspicious ones as might be confounded with those given as esculent. Each chart contains a good description of the fungus or fungi illustrated, and, in the case of the esculent species, the best methods of preparing them for the table. The illustrations are in every case very true to nature, and by far the most accurate of the kind that we have ever seen.

While there is a large number of persons actively engaged in the scientific study of fungi in this country, there are few persons who have studied these plants solely with a view to ascertaining their edible or poisonous properties. Among the few who have done so is the editor of this collection, who has devoted more than ten years to experiment in this field of research. Of his ability to prepare such a work, then, there can be no doubt.

We do not agree with Mr. Palmer that the terms "mushroom" and "toadstool" "are both applied with equal reason to any fleshy fungus," and that they should be used as synonyms, "like the corresponding terms 'plant' and 'vegetable,' or 'shrub' and 'bush.'" Toadstool is a very useful general designation for fungi of the order Agaricini and the genus *Boletus*, but the name mushroom should be restricted to *Agaricus campestris*, to which it was transferred in early times from another edible species, *Agaricus Georgii*, Fr. (*A. Mouceron*, Secr.) Should these charts receive a welcome from the public, it is the intention of the publishers to furnish a supplement, from time to time, under Mr. Palmer's supervision, until the illustrations comprise all or nearly all of the edible fungi of America.